

## ABSTRACT OF THE DISCLOSURE

SENSING METHODS AND DEVICES FOR A BATTERYLESS,  
OSCILLATORLESS, BINARY TIME CELL USABLE AS AN HOROLOGICAL  
DEVICE

A simple electronic horological device, termed a time cell, is presented with associated methods, systems, and computer program products. A time cell has an insulated, charge storage element that receives an electrostatic charge through its insulating medium, i.e. it is programmed. Over time, the charge storage element then loses the electrostatic charge through its insulating medium. Given the reduction of the electric potential of the programmed charge storage element at a substantially known discharge rate, and by observing the electric potential of the programmed charge storage element at a given point in time, an elapsed time period can be determined. Thus, the time cell is able to measure an elapsed time period without a continuous power source. One type of time cell is a binary time cell that may have a form similar to a non-volatile memory cell. At a given point in time after the binary time cell has been programmed, a read operation allows a binary determination as to whether or not a particular time period has elapsed by observing two possible states of the time cell: the time cell has retained enough charge such that the time cell appears to be a programmed time cell; or the time cell has been discharged during the elapsed time period such that the time cell appears to be a non-programmed time cell. A time cell can be designed and/or programmed to select the particular time period to be measured.